

WHAT IS CLAIMED IS:

1. A method of making fastener products having an array of male fastener elements formed of resin, the method comprising:

providing a mold roll defining an array of cavities extending inwardly from an outer surface thereof, the mold roll positioned adjacent a counter-rotating pressure roll to define a pressure nip;

extruding moldable resin in discrete doses through an orifice defined in an outer surface of a rotating die wheel;

transferring the extruded resin into the pressure nip in such a manner that the resin is transferred into the nip in discrete regions corresponding to the doses of extruded resin;

laminating the moldable resin to a carrier sheet;

pressing the regions of resin into multiple cavities of the mold roll in the pressure nip to form at least the stems of the fastener elements, while forming a base of the resin on the surface of the mold roll, the base interconnecting the fastener element stems; and

stripping the resin from the mold roll surface on the carrier sheet.

2. The method of claim 1, wherein the resin is transferred as a series of discrete regions spaced apart according to revolutions of the die wheel.

3. The method of claim 1, wherein the resin is transferred as a multiple number of regions per revolution of the die wheel.

4. The method of claim 1, wherein the die wheel defines multiple extrusion orifices.

5. The method of claim 1, wherein the extrusion orifices are spaced apart along a rotational axis of the die wheel.

6. The method of claim 1, wherein the extrusion orifices are spaced apart about a circumference of the die wheel, such that multiple discrete regions of resin are transferred per revolution of the die wheel.

7. The method of claim 1, wherein the resin is extruded at such a rate that causes adjacent doses of resin to merge on the carrier sheet.

8. The method of claim 7, wherein the adjacent doses merge under nip pressure to form the base as a contiguous layer of resin.

9. The method of claim 1, wherein the multiple extrusion orifices are arranged adjacent one another in a grouping, such that doses of resin from the orifices in the grouping are transferred into the pressure nip in a pattern of an overall shape determined by a shape of the grouping of orifices in the die wheel.

10. The method of claim 9, wherein the adjacent doses of resin in the transferred pattern merge to fill the overall pattern shape with a contiguous layer of resin.

11. The method of claim 1, wherein the orifice is elongated at the outer surface of the die wheel.

12. The method of claim 1, wherein the orifice extends through the die wheel between two openings at the outer surface of the die wheel, the die wheel rotating adjacent a source of pressurized molten resin cyclically exposed to the orifice.

13. The method of claim 12, wherein the source of pressurized molten resin comprises an extrusion shoe forming a seal against the die wheel.

14. The method of claim 12, wherein the two openings are disposed on opposite sides of the die wheel.

15. The method of claim 12, wherein the two openings rotate within parallel planes spaced apart along a rotational axis of the die wheel, the orifice extending at an acute angle to the rotational axis.

16. The method of claim 1, wherein the orifice extends between an opening at an outer surface of the die wheel and an opening at an inner surface of the die wheel, the die wheel defining therein a reservoir containing pressurized, molten resin.

17. The method of claim 1, wherein the die wheel comprises a rotating sleeve disposed about a rotationally stationary cylinder defining an outer opening in hydraulic communication with the die wheel reservoir, the die wheel rotating to cyclically align the orifice and outer opening.

18. The method of claim 1, wherein the outer opening of the cylinder comprises a longitudinal slot.

19. The method of claim 1, further comprising adjusting a rotational orientation of the cylinder to position an extrusion orientation of the die wheel.

20. The method of claim 1, wherein the resin is carried into the pressure nip on the carrier sheet.

21. The method of claim 20, wherein the carrier sheet is trained about the rotating die wheel.

22. The method of claim 20, wherein the resin is wiped onto the carrier sheet from the outer surface of the rotating die wheel

23. The method of claim 20, wherein the carrier sheet passes through a nip defined between the die wheel and a counter-rotating roller.

24. The method of 1, wherein the resin is transferred into the pressure nip by first being transferred from the outer surface of the die wheel to the outer surface of the mold roll, and then carried into the pressure nip by rotation of the mold roll.

25. The method of claim 1, wherein the resin is transferred into the pressure nip by first being transferred from the outer surface of the die wheel to an outer surface of the pressure roll, and then carried into the pressure nip by rotation of the pressure roll.

26. The method of claim 1, wherein the resin is laminated to the carrier sheet in the pressure nip, the carrier sheet being carried into the nip between the resin and the mold roll, pressure in the nip forcing the resin through the carrier sheet to fill the mold roll cavities.

27. The method of claim 1, further comprising forming engageable heads on distal ends of the fastener element stems.

28. The method of claim 27, wherein the mold roll cavities are shaped to mold the engageable heads.

29. The method of claim 27, wherein the heads are formed by deforming distal ends of the mold stems, after stripping the resin from the mold roll surface.

30. An apparatus for making fastener products having an array of male fastener elements formed of resin, the apparatus comprising:

a mold roll defining an array of cavities extending inwardly from an outer surface thereof;

a counter-rotating pressure roll positioned adjacent the mold roll to define a pressure nip;

a rotating die wheel defining an extrusion orifice in an outer surface thereof, the die wheel positioned so as to transfer extruded resin into the pressure nip in discrete regions corresponding to doses of resin extruded through the orifice, the discrete regions of resin being laminated to a carrier sheet and pressed into multiple cavities of the mold roll in the pressure nip to form at least the stems of the fastener elements, while forming a base of the resin on the surface of the mold roll, the base interconnecting the fastener element stems.

31. A method of making fastener products having an array of male fastener elements formed of resin, the method comprising:

providing a mold roll defining an array of cavities extending inwardly from an outer surface thereof, the mold roll positioned adjacent a counter-rotating pressure roll to define a pressure nip;

extruding moldable resin as discrete doses through an orifice defined in an outer surface of a rotating die wheel, the extruding occurring at such a rate that the discrete doses at least partially merge;

transferring the extruded resin into the pressure nip in such a manner that the resin is transferred into the nip;

pressing the at least partially merged doses of resin into multiple cavities of the mold roll in the pressure nip to form at least the stems of the fastener elements, while forming a contiguous base of the resin on the surface of the mold roll, the base interconnecting the fastener element stems.

32. The method of claim 1, further comprising laminating a carrier to the molten resin, the adjacent doses of resin forming a contiguous layer of resin.

33. The method of claim 31, wherein the extruding is done on the mold roll.

34. The method of claim 31, wherein the extruding is done on the pressure roll.

35. A method of making fastener products having an array of male fastener elements formed of resin, the method comprising:

providing a mold roll defining an array of cavities extending inwardly from an outer surface thereof, the mold roll positioned adjacent a counter-rotating pressure roll to define a pressure nip;

extruding moldable resin through an orifice defined in an outer surface of a rotatable die wheel while the die wheel is stationary;

transferring the extruded resin into the pressure nip;

pressing the regions of resin into multiple cavities of the mold roll in the pressure nip to form at least the stems of the fastener elements, while forming a base of the resin on the surface of the mold roll, the base interconnecting the fastener element stems; and laminating the moldable resin to a carrier sheet;

36. The method of claim 35, wherein the outer surface defines a plurality of orifices, producing a fastener product with discrete strips of fastener elements along a first direction upon the carrier sheet, the discrete strips being contiguous in a second direction that is perpendicular to the first direction.

37. The method of claim 35, wherein the resin falls through a distance onto the mold roll under the influence of gravity.

38. The method of claim 37, wherein the distance is from about 0.5 inch to about 36 inch.

39. A method of making fastener products having an array of male fastener elements formed of resin, the method comprising:

providing a mold roll defining an array of cavities extending inwardly from an outer surface thereof, the mold roll positioned adjacent a counter-rotating pressure roll to define a pressure nip;

depositing molten resin on the outer surface of the mold roll under substantially atmospheric pressure conditions while the mold roll rotates, the molten resin remaining substantially on the outer surface of the mold roll;

transferring the extruded resin into the pressure nip; and

pressing the resin into multiple cavities of the mold roll in the pressure nip to form at least the stems of the fastener elements, while forming a base of the resin on the surface of the mold roll, the base interconnecting the fastener element stems; and

39. The method of claim 38, wherein the resin is transferred into the nip in discrete regions corresponding to discrete doses of extruded resin.

40. The method of claim 38, further comprising laminating the molten resin to a carrier sheet.